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CANTOR FIRE-RESEARCH
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HVAC SPECIFICATIONS

REQUIREMENTS

All mechanical work shall be free from defects in workmanship and materials for a period of one (1) year from date of final acceptance and shall meet all local and state codes. All defects, which develop or are discovered within this period shall be repaired by the Contractor to the satisfaction of the Engineer and at no additional cost.

GENERAL

- The Contractor shall examine the site of the proposed work to determine the existing conditions that may affect his work.
- It is the intention of the Contract Drawings and Specifications to call for finished work, tested and ready for operation. All materials shall be new and of first-quality.
- All material, work, incidental accessories or other details not shown but necessary to make the work complete and perfect, and in all respects ready for operation, even if not particularly specified, shall be provided by the Contractor at no additional cost.
- The Contract Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of ductwork, pouches, and induction units. Existing ducts, pipes, utilities, etc. that are damaged during the construction period, whether or not due to the Contractor's negligence, shall be repaired or replaced by the Contractor and left in a condition satisfactory to the Engineer.
- Coordinate locations of all pouches with architectural reflected ceiling plans.
- The space around pipes, ducts, etc. penetrating rated walls, shall not exceed 1/2" and shall be packed solid with Thermalfiber, Mineral Wool or equivalent non combustible material. Perimeter shall be closed off by tight fitting metal escutcheons on both sides of this construction as required by Sections C26-504.5 (b) of N.Y.C. Building Code.

MATERIALS TO BE RETURNED TO THE AUTHORITY

- The Contractor shall deliver all excess material as shown below to a designated area in the W.T.C. complex as directed by the Engineer.
 - One (1) full capacity Induction unit

MATERIALS PURCHASED FROM THE AUTHORITY

- The Contractor shall purchase the following materials from the Authority as required for the installation.
 - One (1) 1 1/2 capacity Induction unit

DUCTWORK

- All ductwork shall be furnished, installed and fabricated in accordance with the latest edition of the SMACNA Duct Construction Standards Manual, using prime sheets of galvanized steel. All square elbows shall be provided with turning vanes on maximum 4" centers. Provide access doors at all fire and automatic dampers for access.
- All branches and take-offs shall be equipped with volume controllers.
- All finger ducts and flexible connectors shall be 7" diameter unless otherwise indicated on drawing.
- Support horizontal ducts with hangers secured to structural steel above at intervals not exceeding 8'0". Install additional steel as required.
- Flexible connectors to the supply duct and the diffuser plenum of ceiling pouches shall be sealed with 3M Co. 800 sealant and clamped with Stainless Steel Ideal Type 52 clamps.
- All access doors shall be as per latest SMACNA Standards.

ACOUSTICAL DUCT LINER FOR INTERIOR DUCT SURFACES

- Application
Acoustical duct liner shall be installed on the interior surface of the ductwork from the discharge connection of the HVAC equipment for a minimum distance of 10 feet.
- Material
 - One inch thick rigid fiber glass duct liner board.
 - Insulation, including adhesive, shall have a composite fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding a "Flame Spread" of 25 and a "Smoke Developed" of 50. Johns-Manville "Linacoustic R" or approved equal.
 - Insulation shall have a density of 1.5 lbs. per cubic foot with a thermal conductivity of K=0.26 BTU/in/sq ft/deg F/hr at 75 F mean temperature.
 - The duct liner shall have a NRC of no less than 0.70 based on No. 6 mounting, (Test Method C423) and suitable for air velocities up to 2000 FPM.
- Installation
 - Apply duct liner to duct surfaces with 100% coverage and approved adhesive.
 - The black surface of the liner shall face the air stream. All joints shall be snug and neatly butted.
 - All exposed edges and joints shall be heavily coated with approved adhesive. A metal nosing shall be installed on all leading edges of the liner.
 - On ductwork over 12" in width and/or sizes over 16" in height, additional mechanical fasteners on a maximum of 15" O.C. shall be used to fasten the duct liner to the duct. Fasteners shall be installed within 3" of the leading edges of all cross joints. All mechanical fasteners shall be flush with liner surface.

INDUCTION UNITS

- Support and fasten units to prevent all vibration, providing all required wall brackets supporting legs and leveling devices. Units support method shall be subject to the approval of the Engineer and be similar to the method used for the existing units.
- The Contractor shall adjust induction unit performance as shown on the contract drawings.
- The air connection to the induction units shall be made with "Thermoflex" Type S-TL as manufactured by Automated Industries or approved equal, of sizes shown, but not less than the full unit inlet size. The connections shall be sealed with Minnesota Mining & Mfg. Co. 800 sealant and clamped with Ideal Type 52 hose clamps, or approved equal. Flexible connections that penetrate any rated closures shall be installed as specified.

PIPING

All piping connecting to the induction unit shall be Copper ASTM B-86, soft (annealed) Type L and fittings shall be standard weight copper and solder type. All soldered joints shall be made with 95-5 Tin Antimony Solder having a melting point greater than 450 Deg. F. All soldered joints shall be thoroughly cleaned before the application of the solder. All insulation shall match existing.

LINT SCREEN AND AIR TRANSFER FITTING

The Contractor shall provide lint screens and air transfer fittings for specified induction units.

VIBRATION ELIMINATORS

Vibration Hangers shall be HDA- GREEN (4 Req'd.) as manufactured by Mason Industries or an approved equal.

CEILING EXHAUST FAN

The Contractor shall relocate the existing ceiling exhaust fan shown on the plan to its new location shown.

FAN SUPPORTING REQUIREMENTS

- All supporting steel shall conform to ASTM Designation A-36.
- All nuts must have lock washers.
- Contractor shall field measure and verify existing conditions.

CEILING REGISTERS, GRILLS, DIFFUSERS & LINEAR

Model numbers specified are manufactured by Anemostat- Waterloo or an approved equal. All finishes shall be baked white enamel.

- Diffusers (Supply): shall be Model DF with No. 41 core pattern (4-way)
- Grills (Return): shall be Model S3HD
- Damper: Damper for diffusers shall be Model DOB.

WATER COOLED AIR CONDITIONING UNIT

- Furnish and install a packaged air conditioning unit. Unit shall be complete with temperature control, compressor, evaporator coil, condenser water regulating valve and other system components required to provide proper air conditioning for the space designated on the Contract Drawings. Filter shall be Class I, UL listed; 45% efficiency.
- AC Unit shall be furnished with the following accessories:
 - Condensate Pump
 - Thermostat
 - Disconnect Switch
- Schedule

Unit No.	CFM	Blower Motor Ext.	H.P.	S.P.	Auxiliary Total Cooling Cap. (BTU/Hr)		Cooling Water GPM		Model	Total Wt.(NET)
					80 DB, 67 WB	85 Deg. F F.W.T.	No.			
AC-18	700	1/4	.00		19500	3.7 Gpm			MM20W	250lbs.
AC-19	700	1/4	.00		19500	3.7 Gpm			MM20W	250lbs.

AC Unit motor shall be 1 phase and for 277 volts.

- The Unit shall be factory run, tested and rated in accordance with ARI Standards.
- AC Unit shall be complete with water regulating valve. Valve shall be rated for 150 psi. working pressure *W/POSITIVE SHUT-OFF, METRIX WCCW OR APPROVED EQUAL.*
- Unit shall be similar or equal to Liebert Corp. and rated at 150 lbs. working pressure.
- Vibration pad shall be "Shear Flex-Flex Plate" as manufactured by Vibration Mountings Control Inc. or an approved equal.

PIPING AND ACCESSORIES

- TEST REQUIREMENTS (Aux. Cooling Water)

Operating Pressure	150 PSIG
Operating Temperature	85 Deg. F - 95 Deg. F
Hydrostatic Test Pressure	1.5 x Operating Pressure
Duration of Test	2 hours

Isolate equipment, controls, instruments and valves from the piping system during hydrostatic tests

B. Piping & Fittings

System	Pipe	Fittings
Aux. Cooling Water	Black Steel Pipe, Conforming to ASTM A-53 Schedule #40 Grade B, Black Seamless	2-1/2" cast iron screwed 250 lb. class
A.C. Unit Condensate Drain	Copper ASTM B-88 Hard Temper Type (L)	Wrought Copper Solder Joint 5 ANSI B16.18
Domestic Water	Hard Temper Copper Type (TP)-ASTM B302	Cast Bronze for Brazing - ANSI B16.18

Vent auxiliary cooling water piping at all high points.

C. Accessories

- Unions for auxiliary cooling water service shall be similar and equal to 250 lb. class, malleable iron with bronze seats, Grinnell Figure 554, U.L.
- Nipples 6" length or less, shall be extra heavy and the material shall be the same as the pipe. Close nipples shall not be used.
- Braided type flexible connector shall be Vibration Mounting and Control Inc., (VICO) Model MFP Style NE Max. 280 psig or approved equal.

D. Soldered Joints

95-5 Tin-Antimony Solder having a melting point greater than 450 F. Excess solder shall be removed while still in the molten state with a fillet left at the face of the fitting.

E. Thermometers

- Thermometers for piping shall be of the "all angle" (universal), separate socket, industrial type with #304 stainless steel extension neck wells.
- The thermometer for auxiliary cooling shall operate at 0 - 160 Deg. F range and shall include a sufficient safety margin at either end.
- Thermometers shall be as manufactured by Albert A. Weiss, Weksler Instrument Co., Ashcroft or approved equal.

F. Pressure Gauges

- Pressure gauges shall be of the bourdon tube spring type with 4-1/2" dial sizes. Gauges shall have black aluminum cases with black numbers on white background. The gauges shall be as manufactured by Albert A. Weiss, Weksler Instrument Co. Ashcroft or approved equal.
- The pressure range for the auxiliary cooling, shall be 0 - psi. and the Bourdon tube shall be Bronze.

G. Strainers

Strainers shall be similar and equal to those manufactured by Muller Steam Specialty Co. Screwed "Y" strainers for pipes 2-1/2" and smaller shall be 250 lb. No.11 The screens for the strainers shall be stainless steel. Strainers shall be provided with capped blowdown valves.

H. Cutting and Patching, Sleeves and Escutcheons

- Pipe passing through walls shall have a trim opening cut no greater than necessary for the installation of a sleeve secured therein. Sleeves shall be 1/2" in diameter larger the outside diameter of the pipe or required insulation passing through, and of sufficient length to be flush with the finished wall surfaces. Sleeves shall be made of Schedule 40 galvanized steel pipe for concrete block partitions and 20 gauge sheet metal for framed partitions.
- Pipe passing through floor slabs shall have an opening core drilled 1/2" in diameter larger than the outside diameter of the pipe or required insulation passing through.
- Annular spaces between piping and sleeves or core drilled floor openings shall be packed with thermalfiber and sealed to retain the fire integrity of the walls and floors with a non-hardening compound similar and equal to Uniseal or Duxseal as manufactured by Johns Manville Co.
- All piping passing through walls, floors or ceilings shall be fitted with chromium plated cast brass escutcheons with fastening set screws similar and equal to Fee & Mason Manufacturing Co., F & S Manufacturing Co. or Ritter Pattern and Casting Co.

I. Pipe Supports and Hangers

- All supports and parts shall conform to the latest requirements of the ANSI Code for pressure piping B31.10 and MSS standard practice SP-58.
- Hangers shall be manufactured by Grinnell Co., Central Iron, Fee and Mason, Blawnox Co. or an approved equal.
- Pipe hangers, rods, inserts and clamps shall be those approved for hteir respective uses by the Underwriters' Laboratories, Inc.
- Unless otherwise specifically approved, hanger size and spacing shall be:

	Pipe Sizes	Max Hanger Spacing		Minimum Rod Sizes	
		7 ft. o.c.	9 ft. o.c.	3/8"	3/8"
steel	1/2" to 1"				
	1-1/4" to 2"				
copper	1/2" to 1-1/4"	6 ft. o.c.		3/8"	

J. Valves

1. Type	Size	Pressure	Jenkins	Crane	Stockham
			Fig. No.	Fig. No.	Fig. No.
Gate	Up to 2"	125 psi.	47U	428-UB	B-105
Gate	Up to 2"	150 psi.	49U	431	B-128
Gate	Up to 2"	300 psi.	280U	634E	B-144